Powertech Class III Comments

Attachment A-1

Proposed Alternate Solution to Core Sampling

As described in Attachment A-3, Powertech proposes to conduct geochemical modeling using site-specific data to evaluate the geochemical stability of the production zone and the possibility that contaminants could be released from the restored production zone to the aquifer exemption boundary and cause a violation of MCLs or otherwise adversely affect human health. Powertech requests that such site-specific data not be limited to column testing using core samples, since that would not allow Powertech to take advantage of advancing research methodologies. The geochemical modeling procedures and collection of site-specific data would be documented in the Closure Plan, which would be submitted to EPA for review and approval.

In the event that core sampling is required, to solve the economic and technical feasibility issues associated with long-term storage and delayed testing of core samples, Powertech requests that the permit allow the flexibility to collect core samples at any time prior to conducting laboratory-scale bench testing and from any down-gradient locations within the aquifer exemption boundary that can be shown to be unaffected by ISR operations. This would include locations down-gradient from perimeter monitoring wells that never experienced an excursion during operation, which would be the vast majority of down-gradient wells based on the limited number of excursions that have occurred at operating ISR facilities. Collecting core samples as soon as practicable before testing would minimize the risk of the loss of core integrity and help ensure that the most representative *in-situ* conditions are used during testing. This would be consistent with various recent research studies on natural attenuation, none of which waited 5 to 9 years between core sample collection and laboratory testing.

Attachment A-2

Proposed Alternate Solution to Locating Down-gradient Compliance Boundary Monitoring Wells

Proposed Alternate Solution:

Powertech requests the flexibility to use only perimeter monitoring wells for post-restoration groundwater monitoring, if required.

Attachment A-3

Proposed Alternate Solution to Post-restoration Groundwater Monitoring

A-3-5: Monitoring Is Unnecessary Due to the NRC Groundwater Restoration Approval Process

More information on the ACL approval process is provided in the National Mining Association's comments on the previously proposed 40 CFR Part 192 rulemaking (Exhibit 009 at p. 13, emphasis added):

In the event a licensee determines that an ACL is warranted, it is required to submit a wellfield-specific license amendment application to NRC for its review and approval, including a mandatory technical/safety and environmental review, production of a safety evaluation report (SER) and, at a minimum, an environmental assessment (EA), and notice of an opportunity for an administrative hearing before the Atomic Safety and Licensing Board (ASLB). An ACL is a site-specific (wellfield-specific), constituent-specific, risk-based human health standard that **addresses thirteen specific requirements**, including satisfaction of the ALARA standard, that the Commission will consider when evaluating an ACL license amendment application. Such a license amendment application is required to include an affirmative demonstration by the licensee that all of Criterion 5B(6) standards for ACLs have been met, including the ALARA standard, showing that the licensee has attempted to restore groundwater within the depleted ore body to primary or secondary restoration goals in Criterion 5B(5). In accordance with ACL requirements, the licensee also must demonstrate that the values calculated for ACLs and the geochemistry in the depleted ore body will be adequately protective of human health and the environment at the POE – i.e., will not pose a substantial present or future hazard.

A-3-7: Post-Restoration Groundwater Monitoring Requirements Are Inconsistent with EPA Unified Guidance

a) Detection monitoring vs compliance monitoring
b) Using the full suite of Table 8 parameters is inconsistent with EPA Unified Guidance for detection monitoring.

   Detection monitoring should focus on those constituents known to be present above background concentrations following groundwater restoration, which can only be determined following groundwater restoration. If post-restoration groundwater monitoring is required, Powertech requests flexibility to submit the parameter list to EPA for review and approval.

   c) Use of an increasing trend for detection monitoring is inconsistent with EPA Unified Guidance, which does not recommend trend tests as formal detection monitoring tests. It describes how trend tests are more commonly "applied to background data prior to implementing formal detection monitoring tests" (page 6-41).

   d) read this comment on the retesting strategy & why it doesn't work with detection monitoring

e) The retesting strategy also involves spacing samples only 48 hours apart using low-flow sampling techniques under the natural groundwater gradient (some 5-10 feet/year).

Proposed Alternate Solution:
Powertech requests the ability to prepare a Closure Plan that will be submitted to EPA for review and approval following NRC approval of groundwater restoration in the first wellfield. The Closure Plan will be updated or a new Closure Plan prepared for each subsequent wellfield. The Closure Plan will document groundwater restoration efforts, stability monitoring results, and NRC correspondence during the approval process. This would include documentation of NRC staff's rigorous review process for any ACLs to determine that the ACL does not pose a potential hazard to human health or the environment. As described in Appendix B of the NRC SEIS, this review process includes three risk assessments: 1) a hazard assessment to evaluate the radiological dose and toxicity of the constituents in question and the risk to human health and the environment; 2) an exposure assessment to examine the existing distribution of hazardous constituents, potential sources for future releases and potential consequences associated with the human and environmental exposure to the hazardous constituents; and 3) a corrective action assessment to identify the preferred corrective action to achieve the hazardous constituent concentration that is protective of human health and the environment (Exhibit 008 at p. B-1).
Following the completion of each major wellfield area (i.e., the Dewey area or the Burdock area), the Closure Plan will be updated to include an integrated hydrologic and reactive transport (geochemical) model encompassing all restored wellfields in that area. The model will evaluate the geochemical stability of the production zone and the possibility of release of constituents from the restored production zone to the aquifer exemption boundary. Geochemical modeling using site-specific data would be far superior to post-restoration groundwater monitoring to demonstrate that there will be no threats to human health or the environment at the aquifer exemption boundary. Following are specific advantages to the requested modeling approach:
1) Geochemical modeling is the state of the art approach to demonstrate that there will be no detrimental impacts at the aquifer exemption boundary as part of the ACL application process to NRC for NRC-licensed ISR facilities. This is supported by the following statements by EPA in the previously proposed but discarded 40 CFR part 192 rulemaking:
a. "Geochemical modeling can provide a defensible demonstration of an aquifer's natural capacity to maintain stability, which statistics alone cannot provide." (Exhibit 007 at p. 4172)

b. "We believe that modeling … can provide confidence that a geochemical environment exists to prevent uranium and other constituents from remobilizing …" (Exhibit 007 at p. 4177)
c. "Background data are also needed for geochemical modeling of the groundwater in the production zone and downgradient to support assessments of the natural capacity of the restored production area and downgradient portion of the exempted aquifer to maintain long-term stability of the restored wellfield." (Exhibit 007 at p. 4174)

NRC staff also performed geochemical fate and transport modeling as part of its review of the groundwater restoration report for the Christensen Ranch Project (now part of the Willow Creek ISR Project) in Wyoming (Exhibit 020). The fact that NRC staff did not approve restoration as requested by the operator speaks to the detailed level of review that each ISR wellfield will undergo before receiving NRC approval of successful groundwater restoration.
2) The Closure Plan will provide the ability to evaluate various scenarios related to restoration activities, as well as monitoring strategies and remediation options if required. It would not require decades or centuries to determine whether groundwater restoration efforts are adequate to protect groundwater quality at the aquifer exemption boundary.

For example, consider the scenario where post-restoration groundwater monitoring is required by EPA and that monitoring detects a statistically significant increase after 30 years of post-restoration groundwater monitoring. Based on comment #A-3-1, this would not be an unusual monitoring duration under natural groundwater flow conditions. It is very likely that it would necessitate restarting groundwater restoration efforts in that wellfield. Not only would this be a monumental task in terms of restarting equipment (pumps, pipelines, reverse osmosis units, etc.) that had been idle for decades, but it would necessitate another 30 years of monitoring to see whether the additional groundwater restoration corrected the issue. This lag between adjusting the independent variable (groundwater quality within the wellfield) and determining the resulting change in the dependent variable (down-gradient water quality) makes post-restoration groundwater monitoring technically infeasible. Instead, geochemical modeling would provide predictive concentrations of all constituents of concern at the aquifer exemption boundary at the close of groundwater restoration. This would provide the EPA with the opportunity to review the model and determine whether groundwater would be adequately protected at the aquifer exemption boundary. This review would occur within months of the end of groundwater restoration stability monitoring instead of decades later. If it is determined that additional groundwater restoration efforts are needed or monitoring is required to verify model assumptions, those could be performed relatively quickly and additional assessment performed until EPA is satisfied.

3) Geochemical modeling is already required by the Draft Class III Area Permit. Part IV, Section D.1.e requires "geochemical modeling results demonstrating that no ISR contaminants will cross the down-gradient aquifer exemption boundary" if column testing does not prove that there will be a sufficient decrease in ISR contaminant concentrations. Based on the very narrow definition of what would entail adequate column test results (i.e., no statistically significant increase in the concentration of any constituent during the second set of tests), it is a virtual certainty that geochemical modeling would be required under the draft permit conditions. Further, the draft permit condition requires the model to demonstrate that no ISR contaminants will cross the down-gradient aquifer exemption boundary.

4) The modeling would be based on site-specific data. This could include a variety of data sources such as laboratory testing (e.g., batch sorption testing or column testing), field testing (e.g., cross-hole testing) or other methods. Due to the recent advancements in research technologies, Powertech does not propose to limit the data collection methods to any one method, but proposes to include site-specific data in the Closure Plan, which would be provided to EPA for review and approval.

Attachment A-4

Proposed Alternate Solution to Establishing Baseline Water Quality for Down-gradient Compliance Boundary Monitoring Wells

Proposed Alternate Solution:

Post-restoration groundwater monitoring is unnecessary and should not be required. If it is required, Powertech requests being allowed to collect pre-operational baseline samples from the DGCB monitoring wells at the same frequency as all of the other monitoring wells for each wellfield: at least four samples spaced at least 14 days apart. This is consistent with NRC license requirements and would avoid unnecessary delay in the onset of ISR operations in each wellfield. Site characterization baseline sampling throughout the permit area demonstrated that there is no seasonal variation in water quality in the Fall River and Chilson aquifers, which is not surprising given that these are relatively deep, bedrock aquifers.

In order to avoid collecting an unnecessarily large number of samples in order to update baseline during ISR operations and groundwater restoration, Powertech requests the ability to collect annual samples from the DGCB monitoring wells during the baseline monitoring period (i.e., beginning at the onset of ISR operations). Furthermore, in order to avoid having several years of lag between establishing final baseline concentration limits and beginning post-restoration groundwater monitoring, Powertech requests the ability to continue annual sampling until NRC approval of groundwater restoration. Based on a typical anticipated duration of 3.5 to 8 years from the onset of ISR operations through regulatory approval of groundwater restoration, this would yield at least 4 to 8 additional samples, or 8 to 12 total samples used to establish final baseline concentration limits for post-restoration groundwater monitoring. This is consistent with the 8 to 10 samples recommended by EPA Unified Guidance.

Finally, Powertech requests the ability to submit a groundwater detection monitoring plan for post-restoration groundwater monitoring, if required, that would specify the parameters, retesting strategy and detection limits (prediction limits, tolerance limits, or similar) consistent with EPA Unified Guidance.

Attachment A-5
Proposed Alternate Solution to Column Testing
Part IV, Section D of the Draft Class III Area Permit would require laboratory column testing to verify the attenuation capability of the down-gradient injection zone aquifer. Following are specific comments that describe how the proposed column testing requirements are technically infeasible followed by a proposed alternate solution.

Proposed Alternate Solution:
As described in Attachment A-3, Powertech requests the ability to prepare a Closure Plan that would include geochemical modeling using site-specific data to demonstrate that no ISR contaminants will cross the aquifer exemption boundary and cause a violation of MCLs or otherwise adversely affect human health. Powertech requests the ability to use column testing, batch sorption testing, or any other approved laboratory or field testing method to provide the site-specific inputs for geochemical modeling, should they be needed to support geochemical modeling efforts. Such tests would not be used as a stand-alone demonstration of the down-gradient natural attenuation capacity, but would be an integral part of the geochemical modeling. Powertech requests the flexibility to use synthesized groundwater representative of parameters and concentrations in the restored wellfield for such testing, should it be needed to support geochemical modeling efforts. Powertech also requests that rather than using unrestored groundwater for testing, geochemical modeling would evaluate any hot spots identified during stability monitoring, in accordance with NRC license requirements.

Attachment A-6
Proposed Alternate Solution to
Monitoring and Corrective Actions for an Excursion Detected in a
Non-injection Interval Monitoring Well

Proposed Alternate Solution:

Powertech requests the following alternate solution for monitoring and corrective actions for an excursion in a non-injection interval monitoring well:

1) No change would occur in the procedures for a confirmed excursion beyond what has been reviewed and approved by NRC, as long as the excursion is corrected within 60 days. This includes notifying NRC and EPA, sampling the well with a confirmed excursion for excursion parameters at least once every 7 days, and performing corrective actions as specified in the NRC license. Correcting an excursion within 60 days such that three consecutive weekly samples are below the UCLs is a proven method of preventing contamination outside of the exempted aquifer and is at least as protective as the methods proposed by EPA, which are impractical and technically infeasible due to relatively long laboratory analysis times and the potential for false positives caused by not updating baseline concentrations in non-injection interval monitoring wells.

2) Three changes are proposed if an excursion in a non-injection interval monitoring well is not corrected within 60 days:

a. The State of Wyoming requires analysis of a comprehensive list of parameters only if an excursion is not corrected in a timely manner (Exhibit 004 at p. 22). A second sample must be analyzed for the same list of parameters after the excursion is corrected. Powertech would be willing to add this requirement to help EPA determine that there is no potential for impacts outside of the exempted aquifer.

b. If the excursion occurs in the alluvium, which is not part of the exempted aquifer, Powertech proposes to restore the water quality consistent with baseline concentrations or to an MCL, whichever is greater. Powertech does not propose to conduct the trend analysis in Part IX, Section C.3.f.iii (second number iii), since it is unnecessary given the stringent requirement to restore all constituents to baseline groundwater protection limits.

c. If the excursion occurs within the exempted aquifer, Powertech proposes to conduct an analysis of the potential to impact groundwater quality outside of the exempted aquifer considering site-specific conditions, corrective actions and monitoring results.